

REMARKS

In response to the Office Action dated June 26, 2003, Applicant respectfully requests reconsideration and withdrawal of the rejections. To reduce the issues under consideration, the subject matter of claim 4 has been incorporated into claim 1, claim 2 has been canceled, and claims 5, 6 and 7 have been written in independent form.

Claims 1-8 were rejected under the second paragraph of 35 U.S.C. § 112, on the grounds that they were considered to be indefinite. The Office Action states that it is not clear how embedding the metallized protrusions can be done (a) if the density of the antenna is harder than the material of the metallized protrusions, and (b) if the thickness of the antenna is less than the height of the metallized protrusions. To this end, the Office Action states that the claims should be amended to add the step of "providing the metallized protrusions with a thickness less than the thickness of the antenna."

Applicant respectfully traverses these contentions. First, with respect to "how" the embedding is performed, it is to be noted that it is not the function of the claims to teach how to make or use the invention. Rather, that is the function of the specification. See, for example, In re Johnson & Farnham, 194 USPQ 187 (CCPA 1977) ("One does not look to claims to find out how to practice the invention they define, but to the specification"), and Smith & Nephew, Inc. v. Ethicon, Inc., 61 USPQ2d 1065 (Fed. Cir. 2001) ("A claim is not defective when it states fewer than all of the steps that may be performed in practice of an invention."). The function of the claims is to define the metes and bounds of the invention. It is respectfully submitted that Applicant is entitled to claim the inventive

concept as broadly as the prior art permits, and is not required to recite all of the details for implementing the concept.

Second, the disclosure and claims are directed to those having an ordinary level of skill in the art. See, for example, MPEP §2173.02. It is respectfully submitted that a person having an ordinary level of skill in the manufacture of smart cards would understand what the relative densities of two materials need to be if one of them is to be embedded in the other, and hence it is not necessary to spell this out in the claims. In any event, this concept is implicitly recited in each of claims 4-7, which are now presented in independent form. For instance, claim 4 recited that the antenna is produced from a thermoplastic material, and the chip is connected by thermocompression. Since the thermocompression process applies heat to the materials, the thermoplastic material will be softened, to enable the metallized protrusions to be embedded therein. In the same manner, the hot lamination step of claim 7 causes softening of the thermoplastic material.

Along similar lines, claim 5 recites that the antenna is produced from a "non-polymerized" material, and claim 6 recites that the antenna is produced from a "moist" polymer material. Thus, each of these claims recite sufficient information about the antenna material to enable embedding of the metallized protrusions to take place.

Third, it is respectfully submitted that the height of the antenna does not have to be greater than or equal to that of the protrusions in order for the invention to work. While the specification discloses that such a situation is "preferable", it is not an absolute requirement. The antenna only has to have sufficient thickness to hold the protrusions; it does not have to totally envelop the embedded protrusions to achieve such a result. It is

respectfully submitted that it would be unduly restrictive to require Applicant to amend the claims as set forth in the Action.

With respect to claim 3, the Office Action states that the term "form factor" is not clear. It is respectfully submitted that a person of ordinary skill understands this term to mean the size and shape of an article. See, for example, *The Dictionary of Computer and Internet Terms*, Seventh Edition. (A copy of the title page, copyright page, and page 189 are attached to this Amendment.) In the present case, the form factor for a smart card is a well-defined standard, set forth in ISO 7816-1, which references ISO 7810. Copies of the pertinent pages of these two standards are attached. As can be seen, they define the size and shape of an integrated circuit card, i.e. a smart card. Accordingly, it is submitted that a person skilled in the field of smart card technology would readily understand the meaning of the claim terminology.

Claims 1 and 3-5 were rejected under 35 U.S.C. § 102, and claims 2 and 6-8 were rejected under 35 U.S.C. § 103, on the basis of the Moskowitz et al. patent. For the reasons set forth in Applicant's prior response, it is respectfully submitted that the Moskowitz patent does not disclose nor otherwise suggest the claimed subject matter.

Among other features, claim 1 recites the step of "embedding the metallized protrusions in a thickness of the antenna." One of ordinary skill understands that to "embed" one thing in something else means to "place or fix firmly in surrounding matter." See the definition of "embed" in the accompanying copy of *Webster's New Collegiate Dictionary*. Thus, as shown in Figures 1b and 2b of the present application, the metal

protrusions 5 are disposed within the plane of the antenna layer 2, i.e. the antenna material surrounds the metal protrusions.

The Moskowitz patent does not disclose such a structural arrangement. Rather, as can be clearly seen in Figure 2 of the Moskowitz patent, the solder bumps 225 on the contacts 222 are disposed on the antenna layer 230, and not "in" the material of the antenna. In other words, the antenna material does not surround the solder bumps. The same holds true for the embodiment of Figure 3. A person of ordinary skill would not consider this type of arrangement to be an "embedding" of the solder bumps in the antenna material. The characterization of the disclosed structure as such ignores the plain and ordinary meaning of the terms.

For at least this reason, therefore, the Moskowitz patent does not teach the claimed subject matter. If the rejection is not withdrawn, the examiner is requested to provide a definition of "embedding" which would support the rejection.

Claims 4 and 5 were rejected under 35 U.S.C. § 102 in view of the Moskowitz patent, and under 35 U.S.C. § 103 over the Kohama et al. patent in view of the Moskowitz patent. Claim 4 (which has now been incorporated into claim 1) recited that the antenna is produced from a thermoplastic material loaded with metallic particles, and that the chip is connected to the antenna by thermocompression. As discussed previously, the heat generated by the thermocompression process inherently softens the thermoplastic material, to enable the metal protrusion to become embedded therein. See the specification at page 7, lines 19-26.

The rejections rely upon the Moskowitz patent for its teaching of thermocompression bonding to attach chips to circuitry on the substrate. However, Moskowitz does not teach the use of a thermoplastic material for the antenna, particularly for the purpose of embedding protrusions on the chip into such material by thermocompression. Rather, Moskowitz teaches that the antenna 230 is made of copper. See column 4, lines 5-8. For at least this reason alone, therefore, the Moskowitz patent does not anticipate claim 4 under 35 U.S.C. § 102.

Likewise, the Kohama patent does not contain any teaching to use a thermoconductive material for the antenna, as admitted in the Office Action (page 4, last two lines). Since neither of the references teaches the concept of using a thermoplastic material in combination with thermocompression bonding, they cannot support a prima facie case of obviousness against claim 4, whether considered individually or in combination. Accordingly, the rejection of claim 1, which now incorporates the subject matter of claim 4, should be withdrawn.

For similar reasons, the rejection of claim 7 is not supported by the references, since it also recites that the antenna is produced from a thermoplastic material. In this case, the embedding is achieved by means of a hot lamination process.

Claim 5 recites that the antenna is produced from a non-polymerized conductive material, which is polymerized after the embedding step by applying heat. It is noted that the Office Action does not address these claimed features, and therefore it is not apparent how the references are being interpreted to support the rejections. In any event, it is respectfully submitted that the references do not disclose, nor otherwise suggest, the subject

matter of claim 5. As noted above, the Moskowitz patent only discloses the use of copper to form the antenna. Likewise, the Kohama patent does not disclose the use of a non-polymerized material that is subsequently polymerized by the application of heat.

Accordingly, any logical combination of their teachings would not lead a person of ordinary skill to the claimed subject matter. As such, the rejection is not supported by the references.

Claim 6 recites that the antenna is produced from a moist conductive polymer material. Again, there is no teaching to use such a material for the antenna in either of the references. Contrary to the assertion in the Office Action, Applicant has taught the advantage of using such a material in the context of the present invention. For instance, at page 9, lines 3-13, the specification explains that a polymer material which has not dried facilitates the penetration of the metal protrusions into the thickness of the antenna, i.e. the embedding process. Neither reference teaches the use of a moist polymer for such a purpose, or any other purpose. Accordingly, they cannot be interpreted to suggest the claimed subject matter to a person of ordinary skill.

For the foregoing reasons, it is respectfully submitted that all pending claims are patentable over the teachings of the Kohama patent and the Moskowitz patent, whether they are considered individually or in combination. Reconsideration and withdrawal of the rejections are respectfully requested.

Respectfully submitted,

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Date: October 27, 2003

By:

A handwritten signature in dark ink, appearing to read 'James A. LaBarre', is written over a horizontal line. A large checkmark is drawn to the right of the signature.

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